Presidio Trust

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February 12, 2014

Ms. Lori Koch
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710

Subject: Transmittal of Construction Completion Report and Request for Site Certification, Baker Beach Disturbed Area 2, Presidio of San Francisco, California

Dear Ms. Koch:

Enclosed please find a copy of the Construction Completion Report (CCR) for Baker Beach Disturbed Area 2 (BBDA 2, the Site) for your review and approval. The CCR was prepared by Geosyntec Consultants, on behalf of the Presidio Trust, and documents the implementation of remedial actions at the Site as outlined in the approved Remedial Action Plan. The CCR incorporates red-lined revisions sent to DTSC on February 3, 2014 in response to DTSC comments dated January 22, 2014, and was finalized per your email dated February 4, 2014.

The identified future land use of BBDA 2 is recreational. Native plants have been planted at BBDA 2 in December 2013. Vegetative monitoring will be conducted monthly during the 1-year establishment phase following planting.

In conformance with the requirements of Section 5.16 of the Consent Agreement between the Trust, National Park Service and DTSC, we would like to request site certification for BBDA 2.

Please feel free to contact me (415) 561-4259 or Angela Cutting (510) 828-4248 if you have any additional comments or concerns.

Sincerely,

Eileen Fanelli

Eileen Fanelli
Environmental Remediation Program Manager

Enclosure:
Construction Completion Report, Baker Beach Disturbed Area 2, Presidio of San Francisco, California

cc: Angela Liang Cutting, Roux Associates
Brian Ullensvang, NPS
Agnes Farres, Regional Water Quality Control Board
RAB members

Prepared for

The Presidio Trust
67 Martinez Street
San Francisco, California

FINAL
CONSTRUCTION COMPLETION REPORT
BAKER BEACH DISTURBED AREA 2 REMEDIATION

PRESIDIO OF SAN FRANCISCO, CALIFORNIA

Prepared by

Geosyntec consultants

engineers | scientists | innovators

1111 Broadway, 6th Floor
Oakland, California 94607

Project Number: WR1700

February 2014

FINAL
CONSTRUCTION COMPLETION REPORT
BAKER BEACH DISTURBED AREA 2 REMEDIATION
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

Prepared by

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Project Number: WR1700
February 2014

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Appendix M: Air Monitoring

LIST OF ACRONYMS AND ABBREVIATIONS

ADMP	Air and Dust Monitoring Plan
ASTM	American Society for Testing and Materials
BBDA 2	Baker Beach Disturbed Area 2
BMPs	Best Management Practices
C&T	Curtis and Tompkins
CCR	Construction Completion Report
COCs	Chemicals of Concern
CQA	Construction Quality Assurance
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ECB	Erosion Control Blanket
FS/RAP	Feasibility Study/Remedial Action Plan
bgs	Below Ground Surface
Geosyntec	Geosyntec Consultants, Inc.
GPS	Global Positioning System
HASP	Health And Safety Plan
NPS	National Park Service
PAHs	Polycyclic Aromatic Hydrocarbons
P.E.	Professional Engineer
PM	Particulate Matter
RDIP	Remedial Design and Implementation Plan
SWPPP	Stormwater Pollution Prevention Plan
the Presidio	The Presidio of San Francisco, California
Trust	The Presidio Trust
VMP	Vegetation Management Plan and Environmental Assessment for the Presidio of San Francisco

1. INTRODUCTION

This document presents the Construction Completion Report (CCR) for excavation of debris laden fill and backfill with import soil at Baker Beach Disturbed Area 2 (BBDA 2; the Site) at the Presidio of San Francisco, California (Presidio) (see Figure 1-1). The CCR describes the processes and procedures that were implemented as part of remediation of BBDA 2, as well as design modifications that were made during construction. This CCR includes required elements specified in the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) Guidance Document *Environmental Oversight Agreement* (DTSC, 2004).

1.1 Project Overview

Excavation and offsite disposal of debris fill containing chemicals of concern (COCs) and grading and backfilling of areas with import fill were performed consistent with the requirements of the approved Final Remedial Design and Implementation Plan (RDIP) prepared by Geosyntec Consultants, Inc. (Geosyntec, 2013a) on behalf of the Presidio Trust (the Trust). The RDIP, which was approved by the DTSC on June 19, 2013 (Appendix A), presented the implementation plan for the preferred remedy selected in the Final Feasibility Study and Remedial Action Plan (FS/RAP) for BBDA 2, prepared by AMEC on behalf of the Trust (AMEC, 2013).

1.2 Description of BBDA 2

BBDA 2 was a deposit of debris-bearing fill soil located on a bluff top and slope above Baker Beach at the Presidio of San Francisco (see Figure 1-2). The BBDA 2 Debris Fill Area was bounded by the Battery Godfrey parking area to the north and east, former Baker Beach Disturbed Area 2A (BBDA 2A) to the north, the slopes above Baker Beach to the west, and Magazines 28 and 29 to the east.

The BBDA 2 site is located on a gently-sloping bluff top adjacent to west-facing steep slopes. Until tree and vegetation removal, portions of BBDA 2 were densely vegetated with primarily non-native trees, vines, and shrubs. Below BBDA 2, serpentine outcrops are exposed on cliff faces where there is little to no vegetation. Cypress trees that are part of the Presidio Historic Forest are located east of the Site and to the west and north along the bluff top. East of the BBDA 2 fill area a north-south road is surfaced with crushed red chert and is the current location of the Coastal Trail (Figure 1-2). Site elevations range from approximately 260 feet above mean sea level (MSL) at the Coastal Trail to 220 feet MSL on the western edge of the Site.

The presence of fill material in this area was apparent on aerial photographs from as early as 1955 (Dames & Moore, 1997). The debris fill was characterized by a mixture of soil, construction debris, landscaping debris, and other miscellaneous debris (e.g., cans, bottles, glass, etc.). Debris fill at BBDA 2 is believed to have been placed on a surface that may have supported vestiges of historic earthworks associated with the West Battery magazines (MACTEC, 2006).

Debris fill observed in the test pits and cultural resources trenches was generally composed of coarse and fine grained soils including sandy silt, sandy clay, silty sand, sandy gravel, and clayey gravel. Construction debris (asphalt, bricks, cobbles, concrete, ceramics, waste rock [including red chert and roofing slate]), landscape debris (pockets of tree-trimmings), and a refuse component (automotive parts, tires, cans, bottles, chain-link fence, fence posts, wire, sheet metal, piping, wood, plastic, paper, and glass) were present in the debris fill. Debris fill extended to depths ranging from 2 to approximately 17 feet below ground surface (bgs). Note that the 17 ft depth exceeds the original 12.5 feet bgs identified in the FS/RAP (AMEC, 2013) and RDIP (Geosyntec, 2013a).

COCs in soil identified in the FS/RAP (AMEC, 2013) that posed potential risks to human health and the environment are listed below:

Polycyclic Aromatic Hydrocarbons (PAHs)	Metals	Pesticides
Benzo[a]pyrene	Silver Copper Lead Zinc	4,4'-DDT chlordane

Based on the presence and concentrations of COCs in soil at BBDA 2, debris fill over an approximate 0.7 acre area to depths of up to approximately 17 feet bgs posed a potential risk to human health and the environment and required remediation.

The Site is located in the Coastal Bluffs Planning Area within Area A of the Presidio; and is therefore subject to land uses identified in the General Management Plan Amendment (GMPA) (National Park Service [NPS], 1994). Current and planned land use at the Site and vicinity is recreational. A 260-foot section of the Coastal Trail which is used recreationally for hiking, running, bird watching, etc. is located east of BBDA 2. Under the GMPA future visitor access in native habitat areas will be confined to developed trails to protect native species. Based on discussions with the NPS and the

Conservancy there are conceptual plans to restore earthworks west of Battery Godfrey and construct an overlook or other facilities in the vicinity of BBDA 2.

Cultural resources at the Site include Battery Godfrey and Magazines 27, 28 and 29. Battery Godfrey, located north and east of BBDA 2, is a concrete gun emplacement that was part of the Endicott coastal defense fortification that was constructed between 1891 and 1898. Magazines 27, 28 and 29 are remnants of the 1870s-era West Battery fortification that consisted of protective earthen berms, supported by a brick wall, behind which were gun pits and gun carriage platforms. On either side of the gun pits were brick ordnance magazines, which included Magazines 27, 28 and 29. Magazines 27, 28 and 29 are enveloped by protective earthen mounds covered with non-native vegetation. Battery Godfrey and the West Battery (which includes Magazines 27, 28 and 29 and their appurtenant earthworks) are contributing features to the Presidio National Historic Landmark District (NPS, 1993). Excavation and backfilling at BBDA 2 were performed in accordance with the Archaeological Identification and Monitoring Program (AIMP; Appendix C of the RDIP) to protect these cultural resources and document uncovered artifacts.

1.3 Remedial Design

The RDIP presented the remedial design and provided details of the implementation approach for the preferred remedy for BBDA 2 (Geosyntec, 2013a). The primary elements required to design remediation of BBDA 2 are excavation and final grading plans, supported by slope stability analyses, long term landfill settlement evaluations, drainage and erosion control systems, and structural evaluation of Battery Godfrey and the Magazines located in the vicinity of this battery. A brief summary of the remedial design elements are described below:

- **Grading Approach and Plans** – The anticipated lateral limits of excavation and thicknesses of debris fill were developed in the FS/RAP. The excavation plan was adjusted in the field and was dependent on the amount of fill debris actually uncovered. Confirmation sampling was performed after excavation to evaluate if COCs were still present above the FS/RAP clean-up levels. The lateral extents and depth of excavation were modified in the field until all visually observed debris fill and all fill with COCs above the clean-up level were removed, or safe removal of the debris fill was no longer possible due to the steep grades at the project perimeter. The final grading contours for BBDA 2 backfill were designed to promote lateral run-off of surface water and maintain positive slopes after settlement for surface water runoff. Final backfill grades restored the pre-construction topography around

Magazines 28 and 29 and were designed to appear similar to the topography to the north and south of the Site.

- **Global Slope Stability** – Geosyntec performed slope stability analyses along two cross-sections through BBDA 2. Stability analyses focused on three scenarios: 1) global stability with existing conditions, 2) global stability post excavation, and 3) global stability post final grading. A static factor of safety of 1.2 was found for existing conditions for deep slip surfaces through the relatively shallow weathered serpentine and for locally steep slopes near the top of the serpentine bluffs. The global stability of the temporary post-excavation grades and the final backfill grades were similar to the stability of the existing conditions, and had a factor of safety of approximately 1.2. The critical failure surface post-excavation and for final grades were slip surfaces through serpentine at the local free-face near the proposed excavation. Results showed that excavation and backfill have a limited impact on the overall factor of safety of the slopes. Remediation at BBDA 2 can be considered relatively stable in the short term, however, the coastal bluffs are inherently unstable, as is evidenced by extensive landslides in the area, and the remediation does not greatly affect the global slope stability.

- **Structural Evaluation of Battery Godfrey and Magazines –** Wiss, Janney, Elstner Associates, Inc. (WJE) conducted a condition survey of the historic magazines adjacent to the excavation and backfill footprint at BBDA 2. WJE issued a report documenting their observations of the historic structures' condition and provided recommendations related to mitigating potential adverse impacts from construction (WJE, 2013). The WJE report served as a baseline for visual observations during the construction. Construction was conducted following the guidelines for mitigating adverse impacts in the WJE report, and under the observation of a cultural resource monitor, and no adverse impact to the historic structures was reported during this project.

- **Surface Water Management and Erosion Control** – The BBDA 2 surface water management and erosion control system was designed to protect the final grades in-place and limit erosion rills and shallow slumps. Final erosion controls at the Site generally consisted of spreading weed-free rice straw product across all disturbed areas, covering with erosion control blankets appropriately rated for the given slopes, and placing fiber rolls on-contour to help stabilize the slope surface. The final grading plan was developed to maintain distributed overland flow and minimize the potential for short term erosion; however, some future erosion, rilling, and gullying within and downslope of the project area can be expected, requiring

maintenance and minor re-grading, if necessary. Natural fiber blankets, fiber rolls, stakes, and all other erosion control features remaining on site are bio-degradable.

Details of the above elements can be seen on the as-built drawings included as Appendix L. Construction photographs of these elements are shown in the photo log included as Appendix B.

1.4 Implementation Approach

Implementation of the preferred remedy at BBDA 2 included the following general steps:

- **Remedial Excavation –** This step involved excavation to remove known impacted debris fill from the Site. Depths of excavation varied across the site, and varied between 0.5 to 17 feet below the pre-construction ground surface. Excavation generally followed the excavation plan shown on Drawing 5 of the construction drawings (Appendix K), but actual excavation grades varied depending on the observed extent of debris fill. After soils were excavated, confirmation samples were collected from the floor and perimeter of the excavation. Based on the results of the confirmation soil samples and the presence of observed debris at the grades shown on Sheet 5 of the construction drawings, additional excavation was required. Figure 2 in Appendix L-2 shows the actual extent and excavation grades for the Site. Excavation continued until all debris containing COCs was removed, or when removal of any additional debris fill was no longer possible due to proximity of cultural resources (e.g. magazines) or due to safety concerns with excavation adjacent to the bluff edge.

- **Backfilling and Final Grading –** The Contractor began backfilling after excavation grades had been reached, confirmation sampling results were received, and concurrence from the DTSC that residual COC concentrations in soil met cleanup levels for the Site was received. The import materials were serpentine soils similar to naturally occurring soils found at the site. Backfilling and grading followed the design grades shown on Drawing 6, as modified by revisions 1 and 2, described in detail in Sections 5.2.2 and 5.2.3 of this report. Soil was keyed into the slope, placed in 6-inch compacted lifts, and compacted and tested per the technical specifications.

- **Landscaping and Erosion Controls** – Following completion of post-excavation grading, erosion control materials identified in the specifications were installed at the Site. The Contractor performed this work in accordance with the design

drawings and technical specifications. Plans are in place to re-vegetate the Site following the planting plan for the site. The Trust will monitor the Site regularly for erosion control.

Further details of these activities are included in Section 3.

1.5 Project Organization

Figure 1-3 shows the project organization chart for the remedial construction project. Key members included the Trust (Project Manager, Construction Manager), National Park Service (NPS; Land Management Agency), California Environmental Protection Agency, Department of Toxic Substances Control (DTSC; Regulator), Geosyntec (Designer and Construction Quality Assurance Engineer), and Engineering/Remediation Resources Group, Inc. (ERRG; General Contractor). Several other entities within the Trust participated in the design process and provided input or support during construction.

1.6 Report Organization

The remainder of this CCR is organized as follows:

- **Section 2: Site Preparation Activities** – Describes work activities performed prior to start of excavation and debris removal, including measures implemented to protect natural resources; planning documents, permits, and construction submittals submitted for agency review; public outreach programs; and temporary facilities installed in support of remedial construction work.

- **Section 3: Construction Activities** – Describes work performed during grading and backfilling construction activities, from site clearing and debris removal through establishment of post-construction erosion control best management practices (BMPs);

- **Section 4: Construction Quality Assurance (CQA) Program -** Presents a summary of the CQA program;

- **Section 5: Design Modifications and Field Variances** – Describes elements of the original design that were modified based on variances observed in the field;

- **Section 6: Earthwork Quality Assurance –** Presents details of the CQA program related to earthwork activities;

- **Section 7: Debris Fill and Material Characterization and Disposal –** Describes the activities performed to characterize debris fill that was removed from the site. Includes documentation of final disposal of these materials.

- **Section 8: Air Monitoring –** Presents details of the air monitoring program implemented during earthwork activities;

- **Section 9: Summary and Conclusions** – Summarizes results of remedial action with respect to project remedial action objectives.

- **Section 10: Certification –** Presents the certification of the project by the CQA Engineer of Record;

- **Section 11: References** – Provides a list of documents referenced in this CCR.

- **Section 12: Limitations –** Presents limitations on the application of the information presented in this report.

DTSC approval of the RDIP is included in Appendix A. Photographic documentation related to the CQA activities is presented in Appendix B. Construction Memoranda are included in Appendix C. Project correspondence, including contractor submittals, are included in Appendix D. CQA documentation, including project correspondence, field logs, laboratory test results, field test results, and disposal documentation are included in Appendices E and G through J. Appendix F includes the Archaeological Investigation and Monitoring Report (AIMR) prepared by AMEC. Copies of the Construction Drawings are included in Appendix K. The as-built data and record drawings, including the drawings showing the as-built excavation and final grades, are presented in Appendix L. Records related to the air monitoring program are presented in Appendix M.

2. SITE PREPARATION ACTIVITIES

2.1 Public Outreach

The Trust installed temporary signs notifying the public of upcoming remedial construction activities. In addition, the Trust contracted and coordinated with the NPS and the Golden Gate National Parks Conservancy (Conservancy) to develop and implement a signage and public outreach program during remedial construction including developing informational flyers and signs describing the planned remedial construction program. Public Information Coordinators (PICs) patrolled the Site during construction to direct the public to trail detours and provide information concerning the remedial construction project. Information about the project, schedule, and a copy of the RAP were made available on the Trust website.

2.2 Nesting Bird and Sensitive Plant Survey

Prior to vegetation removal at the Site, an H.T. Harvey & Associates (HTH) ornithologist conducted a pre-construction nesting bird survey for any evidence of nesting raptors, and other birds, including nest starts, birds carrying materials or food, distraction displays, and other physical or behavioral evidence of nesting. The survey was conducted on 13 February 2013, and no birds displaying nesting behavior were observed and no active nests (i.e., nests with one or more eggs) were detected within the BBDA 2 area. An additional survey was conducted on 25 June 2013 prior to the start of construction, and no birds displaying nesting behavior were observed and no active nests were detected.

On 12 February 2013, an HTH restoration/plant ecologist visited the Site to conduct a pre-construction sensitive plant survey. During the visit, all locations of sensitive plants, including those previously identified by the NPS were marked in the field with a colored flag pin and labeled with the species name. Two, sensitive plant species, *Arabis blepharophylla* and *Erysimum fransiscanum*, were encountered at the Site and flagged. A third sensitive plant species, *Clarkia franciscana*, previously mapped at the Site, was not encountered during HTH's survey.

On 15 February 2013 HTH's restoration/plant ecologist met onsite with an NPS biologist and finalized the limits of the vegetation management area in order to protect relatively intact coastal prairie and coastal shrub habitat. The sensitive plant habitat did not extend into the excavation footprint. Survey results are documented in a 21 February 2013 memorandum by HTH which is included in Appendix D-1.

2.3 Vegetation Removal

All large trees at the site were cut in December 2012 in advance of raptor nesting season. Shrubs and vegetation at the Site were removed between 25 February and 4 March 2013. All large shrubs and vegetation were cut by 28 February 2013 to comply with ground bird nesting season. The existing vegetation, including low shrubs, ivy, weeds, and small trees were removed in accordance with the protocols described in the Work Plan for Vegetation Management prepared by Geosyntec (Geosyntec, 2013b).

During vegetation removal, an archeologist was present to ensure that cultural resources encountered, if any, were not impacted during the activities; and to document the location or condition of any resources previously covered by vegetation.

2.4 Fencing and Trail Closure

Security fencing and construction signage was installed around the site boundary by ERRG prior to the start of grading activities. The Coastal Trail, which runs along the east side of Battery Godfrey and Magazines 27, 28 and 29, was rerouted during construction. The beach directly below the construction area of BBDA 2 (Marshall Beach) was closed to the public and signs notifying the public of the beach closure were installed. In addition, signage was placed to notify the public of the work and route traffic around the Site, as indicated on Drawing 2 of the Construction Drawings (Appendix K). Within the fenced site, the Contractor established an appropriate exclusion zone, decontamination zone, and support zone. These zones were detailed in the Contractor's Health and Safety Plan (HASP).

2.5 Temporary Facilities

During mobilization, ERRG installed the following temporary facilities in the staging area shown on Drawing 3 of the Construction Drawings (Appendix K):

- one construction trailer to serve as field office;
- one small equipment storage trailer; and
- sanitation facilities consisting of two portable toilets and one wash station.

2.6 Traffic Controls

Road closure signs, traffic cones, and barricades were placed at the intersection of Lincoln Avenue and Langdon Court. Trail closure signs were affixed to perimeter site fencing at all access points to the project site. Access to the parking area at the end of

Langdon Court was gated and therefore closed or otherwise controlled for the duration of construction. On days when material was either being off-hauled or imported, ERRG positioned a flagperson at the intersection of Lincoln Avenue and Langdon Court to control ingress and egress to the site. On days with over 30 truck trips in a single day, the Contractor designated a trucking manager with the responsibility of organizing and facilitating hauling activities so that they would be accomplished in a safe and clean manner.

2.7 Import Fill Materials Evaluation

Two different serpentine soils were used for backfilling operations at BBDA 2. All import fills were required to be suitable both chemically and geotechnically. Soils within the top twelve (12) inches from the final fill grades for the site were to be amended as described on HTH's memo from 19 August 2013 titled "Revised amendment recommendation for serpentine soil to be used at Baker Beach Area 2", which is included in Appendix D-1.

The sections that follow describe the source of each of the import fill material and testing performed to verify suitability for use at BBDA 2. Test results and other relevant documentation for import fill materials are included in Appendix E.

2.7.1 Presidio Soils

The soils used to backfill the BBDA 2 site to the design grades and elevations were imported from two different locations at the Presidio; (1) the Dust Bowl, and (2) the Nike stockpile (see Figure 1-1). The chemical suitability of the serpentine soil obtained from the Dust bowl was previously evaluated as part of the Fill Site 1 and Landfill 2 Remediation project (Kennedy/Jenks, 2012). The suitability of the Nike material was evaluated as part of construction activities at the site.

2.7.1.1 Doyle Drive Replacement Project Soils ("Dust Bowl")

This primarily sandy soil was obtained from the excavations performed as part of the Caltrans' Doyle Drive Replacement project in 2009. Material from this excavation was taken to the Fill Site 1 and Landfill 2 project, where it was used as backfill material for the project. Excess material from that project was then stockpiled in the Dust Bowl until being hauled to BBDA 2. It is estimated that approximately 2,700 yd^3 (loose volume) of Dust Bowl material were used at BBDA 2. This material was used in all fill areas, both as amended and un-amended material. To verify compaction in the field, a moisture/density curve for this material was obtained during construction. Documentation on geotechnical and chemical suitability is included in Appendix E-1.

2.7.1.2 Nike Missile Site Soils ("Nike")

This primarily sandy soil, originating from the trenches excavated for new water lines along Lincoln Boulevard, and stockpiled at the Nike site, was used as import fill along the soil key at the bottom of the fill slopes. It is estimated that approximately 570 loose cubic yards of Nike material were used at BBDA 2. Due to time constraints, and given the small amount of material, no specific moisture/density relationship was obtained for this soil type. To account for the lack of moisture/density information, the Nike soils were placed at the base of the fill away from the slope face, and compacted until firm and non-yielding conditions were observed by CQA personnel. The Nike soils were subsequently covered with "Dust Bowl" soils compacted to the minimum relative density and moisture content required by the project specifications. Concurrence on the use of the Nike soils and the proposed placement approach was provided by DTSC in their letter dated 20 August 2013 (see Appendix E-2.1). Documentation on chemical suitability is included in Appendix E-2.

2.8 Natural Resources Monitoring

Nesting bird and sensitive plant surveys were performed as described in Section 2.2. Vegetation removal was performed as described in Section 2.3. With removal of potential nesting sites, with sensitive plant habitat outside of the excavation footprint, and with appropriate construction controls in place, no additional natural resources monitoring was performed during construction.

2.9 Contractor Plan Preparation

The Contractor submitted the following plans to the Trust for review and approval in accordance with the requirements of the RDIP (Geosyntec, 2013a) and the project specifications:

- HASP;
- Trust Excavation Clearance Permit;
- Stormwater Pollution Prevention Plan (SWPPP);
- Decontamination Plan;
- Dust and Odor Control Plan;
- Traffic Control Plan
- Excavation and Grading Plan;

- Excavated Soil and Stockpile Management Plan;
- Waste Management and Recycling Plan;
- Environmental Protection Plan; and
- Soil Material Management Plan.

3. CONSTRUCTION ACTIVITIES

A summary of major components of the BBDA 2 remediation project are presented here. Construction photographs are included in Appendix B.

3.1 Air Monitoring

Air monitoring was performed by ERRG to assess whether dust generated during excavation posed a threat to human health based on action levels developed in the Air and Dust Monitoring Plan (ADMP). The ADMP was included in Appendix G of the RDIP (Geosyntec, 2013a). Background air and dust monitoring was conducted on 13 July 2013. Construction-phase air monitoring was performed from 15 July through 10 September, 2013. Stationary monitoring was conducted at the project perimeter at one upwind and one downwind location. One additional stationary monitor was placed on the temporary project fence along Lincoln Boulevard to monitor dust concentrations in the area due to heavy truck traffic.

In addition to stationary monitoring, the ADMP also required that instantaneous monitoring be conducted at a frequency of once per hour during the workday. This monitoring would consist of walking the fenced perimeter of the site, at a slow pace, while observing the monitor to evaluate whether any exceedances were detected. Based on observed conditions at the site, and observed practices by ERRG, Geosyntec re-evaluated this requirement and concluded that instantaneous monitoring was not needed at the Site, on the basis that:

- project action levels were based on particulate matter (PM_{10}) action levels and not exposure to site specific contaminants of concern;
- continuous stationary air monitors had been set up at three locations on site: (a) upwind of the project, (b) downwind adjacent to the excavation footprint; and (c) near the project boundary at the Lincoln Boulevard entrance, therefore given the small size of the excavation footprint (< 1 acre), these stationary monitors would be able to provide reasonable coverage; and

- project specifications and the contractor's Dust Control Plan included aggressive dust control measures to minimize the potential for visible dust and control any occurrence of visible dust plumes.

As a result of the re-evaluation, a letter was sent to DTSC on 16 July 2013, requesting to remove the instantaneous monitoring requirement from the ADMP. Concurrence from DTSC was received on 17 July 2013. A copy of the letter sent to DTSC and DTSC's approval of the proposed amendment are included in Appendix D-1.

Air sampling and analytical testing were performed on background air samples and on air samples collected during early phase excavation work to confirm that COC concentrations did not exceed their adjusted risk-based concentrations in air (RBCair) as defined in the ADMP. No BBDA 2 COCs (metals, pesticides and polynuclear aromatic hydrocarbons [PAHs]) were detected in air and dust samples collected during the background and ongoing construction-phase monitoring. The Trust requested to discontinue air and dust monitoring for COCs at the Site on 31 July 2013 (see letter submitted to DTSC in Appendix M-1). This request was approved by DTSC via e-mail on 31 July 2013 (see email on Appendix M-2). Further details on air sampling are included in Section 8.

Routine dust monitoring for particulate matter (PM_{10}) concentrations continued throughout the remaining earthmoving activities. Dust monitoring is discussed in greater detail in Section 8.

3.2 Site Clearing

After site preparation activities were completed, ERRG began site clearing and stump grinding and removal. Although the majority of the trees and the vegetation at the Site had been removed previously due to bird nesting constraints at the Site (see Section 2.3), some low vegetation had re-grown and needed to be removed prior to the beginning of excavation. In addition, at the time that all the trees were removed and off-hauled from the site, it was decided to leave all tree stumps for the Contractor to remove as part of their site clearing and grubbing.

3.3 Debris Fill Excavation

Debris fill excavation began along the southern portion of the Site and moved towards the north as excavation design grades were achieved. Excavated debris fill was temporarily stockpiled along the south side of Building 1648, to the east of Battery

Godfrey, until it was loaded into trucks and off-hauled to the Potrero Hills Landfill for disposal.

As described in Section 3.4 below, based on visual observations of debris and results from the confirmation sampling program, the original excavation footprint for BBDA 2 (see Drawing 5 from the Construction Drawings, Appendix K) had to be modified, and additional debris fill had to be removed from the Site. The original excavation footprint was primarily extended towards the north, with a small additional excavation area on the southern end, and deeper excavation grades were required in the central portion of the site. All debris fill excavated from the Site was disposed of at the Potrero Hills Landfill in Suisun City, California.

3.4 Cultural Resources Monitoring

Cultural monitoring at the Site was performed by AMEC personnel from 9 July to 30 August 2013. Details of the monitoring activities are presented in the AIMR which is included as Appendix F.

3.5 Confirmation Sampling

Soil confirmation sampling was conducted at the Site on 24 and 29 July and 6 and 7 August 2013. Confirmation samples were collected throughout the entire project footprint and along the edges of the excavation, where possible, as described in the *Soil Confirmation Sampling Plan* (Appendix H of the RDIP; Geosyntec, 2013a). Figure 3-1 shows the final location for all confirmation samples collected at the site. Soil samples were collected from the shallow surface interval (0-6 inch below ground surface, bgs) to evaluate whether soils exceeding the COCs for the site had been completely removed.

Soil samples were collected in 2-inch diameter, 6-inch long stainless-steel sleeves. The sleeves were placed inside a stainless-steel sampler which was advanced into the ground using a hand-held drive sampler. Following sample collection, the ends of the sleeves were covered with Teflon and capped with plastic endcaps. Samples were labeled, packaged, and shipped under chain-of-custody protocol to Curtis & Tompkins (C&T) of Berkeley, California for analysis of the following COCs as specified in the Sampling and Analysis Plan (SAP):

- Polynuclear aromatic hydrocarbons (PAHs), which includes the COC benzo[a]pyrene, by U.S. Environmental Protection Agency (USEPA) Method 8270SIM;
- Copper, lead, silver, and zinc by USEPA Method 6020; and

- 4,4'-DDT and chlordane by USEPA Method 8081A.

In accordance with the Presidio-Wide Quality Assurance Project Plan/Sampling and Analysis Plan (Tetra Tech, 2001), Geosyntec submitted Quality Assurance/Quality Control (QA/QC) samples to the laboratory for testing. Upon receipt of analytical results, Geosyntec performed a QA/QC review of all analytical data received from C&T with respect to sample holding times, analytical quantitation limits, field QA/QC samples, matrix spike/matrix spike duplicate analyses (MS/MSD), and laboratory QA/QC results (method blanks, surrogates and laboratory control samples). Based on the data validation review, analytical data were deemed to be of acceptable quality. A summary of the data validation review can be found in Appendix I-5.

Analytical results for soil samples collected on 24 and 29 July and 6 and 7 August 2013 are summarized in Table 3-1, with full laboratory reports provided in Appendix I. Results of confirmation soil samples collected on these dates indicate that COC concentrations were below Soil Cleanup Levels at 21 out of 28 locations (BB2EX301[1] through BB2EX208; BB2EX210 through BB2EX219; and BB2EX224).

The following five locations contained COC concentrations above soil cleanup levels for metals:

- DUP080613 (duplicate of BB2EX209[0.0]) – minor exceedance for zinc (170 mg/kg vs. cleanup level of 160 mg/kg);
- BB2EX220 – exceedance for copper (120 mg/kg vs. cleanup level of 85 mg/kg);
- BB2EX221 – minor exceedance for copper (90 mg/kg vs. cleanup level of 85 mg/kg) and exceedance for zinc (270 mg/kg vs. cleanup level of 160 mg/kg);
- BB2EX222 – exceedance for copper (130 mg/kg vs. cleanup level of 85 mg/kg); and
- BB2EX223 – exceedance for zinc (180 mg/kg vs cleanup level of 85 mg/kg).

Sample DUP080613 (and Sample BB2EX209[0.0]) was a bottom sample near the eastern side of the project where the excavation could not be extended further due to the presence of Magazine 28. Given the very low concentration and the restriction against

[1] Concentrations of copper and zinc exceeded cleanup levels at BB2EX201[0.0]; following additional excavation, sample BB2EX301[0.0] was collected and cleanup levels were not exceeded for any COC. Therefore, cleanup levels were achieved at this location.

further excavation adjacent to the historical Magazine 28 structure, no additional excavation was conducted in this area.

Samples BB2EX220, BB2EX221 and BB2EX222 were taken near the northern edge of the excavation at the interface between clean (no visible debris, waste, etc) chert fill and Colma sandy clay. This cherty fill is very commonly encountered at the Presidio as a paving surface for paths and old roads, and historically it has not been considered a waste. The Colma formation is also known to have relatively high concentrations of zinc, relative to zinc concentrations in other Presidio formations. Based on these factors, no additional excavation was performed in this area.

Perimeter sample BB2EX223 was taken at the southern edge of the excavation which had previously been extended approximately 10 ft south due to copper and zinc concentrations in sample BB2EX201 exceeding the clean-up levels. Subsequently, sample BB2EX301 was collected one foot below BB2EX201 and the results met clean-up levels. Based on the results from BB2EX301 and the minor exceedance for zinc in sample BB2EX223, no additional excavation was conducted in this area.

Samples from locations BB2EX211 and BB2EX218 had reporting limits for 4,4'-DDT and Chlordane that were above cleanup levels. However, these samples were diluted in the lab for both semivolatile and pesticide analyses to overcome matrix interferences. The results for 4,4-DDT and Chlordane in both of these samples were non-detect.

All other locations where exceedances were measured were over-excavated and re-tested until results meeting the project requirements for COCs were met. Emails documenting the results of confirmation sampling and proposed recommendations were provided by the Trust to DTSC on 6 and 14 August 2013. A copy of the emails, tables, figures and laboratory data sent to DTSC are included in Appendix I. Concurrence regarding the proposed over-excavation to remove soils with exceedances at BB2EX201, and to leave soils in place at BB2EX220, BB2EX221, BB2EX222 and BB2EX223 were received from DTSC via email on 7 and 16 August 2013. DTSC approvals are included in Appendix I.

3.6 Backfill Soil Placement

Soils used as backfill are described in Section 2.7. The backfill soil varied in material source and/or compaction requirements depending on the depth of placement within the backfill. The first area to receive engineered fill soils was the key trench at the base of the fill slope. The Nike stockpile soils were placed in 6-inch maximum vertical lifts within and above the key until all available material was used. The Dust Bowl stockpile soils were placed directly over the Nike soils in 6-inch maximum vertical lifts, to the

approximate grades shown on Drawing 6, Revision 2 (Appendix K). Lifts were placed horizontally using a CASE 850L dozer and compacted with a vibratory sheepsfoot roller. The slopes were benched every 6 to 12-vertical inches, as specified on Drawing 8 (Appendix K). Slopes steeper than 3 horizontal to 1 vertical were typically overbuilt, then cut back to the design final grades. Geosyntec monitored the level of compaction applied to the soils and verified that specified densities were achieved, as described in Sections 6.2 and 6.3.

3.7 Soil Amendments

Soil amendments were applied to the uppermost 12 inches of serpentine soils placed as import fill within the areas to be vegetated. Amendments were applied by ERRG personnel on 20 and 21 August 2013, using the recommendations provided by HTH via email on 19 August 2013. A copy of the email provided by HTH is included in Appendix D-1.

Although the email from HTH recommended that amendments be applied to the soils once in place along the slopes, ERRG opted to incorporate the recommended gypsum and sulfur amendments while the soils were stockpiled along the top of the proposed fill slopes (i.e., along the former parking area to the West of Battery Godfrey). Once the amendments were applied to the stockpile, ERRG then proceeded to use their equipment to mix the materials and ensure that all amendments were thoroughly blended into the stockpiled soils. The amended material was then placed to the grades shown on Drawing 6, Revision 2 (Appendix K), and compacted in place, until the target compaction was achieved.

3.8 Erosion Control Measures

Erosion control measures included installation of silt fences, fiber rolls, erosion control blankets (ECBs), and wood mulch as shown on Drawing 10, Revision 2 (see Appendix K). All natural, biodegradable and weed free fiber rolls and ECBs were used along with wood stakes. Wood chip mulch was provided by the Presidio Trust from sources originating from within the Presidio Trust and was placed to a minimum thickness of 3-inches in the areas shown on Drawing 10 (See Appendix K). These erosion control BMPs will be maintained by the Trust.

Periodic maintenance activities at the site should include:

- Replacing fiber rolls and silt fence as they degrade or become damaged;

- Placing additional wood chip mulch as the current mulch degrades and thins; and
- Patching and/or replacing ECBs as they degrade or become damaged.

Should future site monitoring indicate that the current BMPs are not sufficient, additional interim measures can be implemented.

3.9 Surveying Activities

ERRG controlled site elevations using Global Positioning System (GPS) based survey equipment. ERRG's survey equipment consisted of a handheld unit operated by the grade checker to verify consistency with the plans. Licensed surveying was performed by Chaudhary & Associates, Inc. (Chaudhary) under subcontract to ERRG. Chaudhary performed as-needed visits to the site to collect as-built survey data and to check for consistency between ERRG's system and their own. Geosyntec reviewed survey data produced by Chaudhary, as well as supplementary data provided by ERRG's grade checker, to verify consistency with the design intent.

As-built drawings showing surveyed pre-excavation (post-clearing and grubbing) elevations, post-excavation elevations, and final grade elevations, are included in Appendix L-2.

4. CONSTRUCTION QUALITY ASSURANCE PROGRAM

4.1 Scope

4.1.1 Introduction

The scope of the CQA program for the remediation of BBDA 2 included the following:

- construction quality assurance;
- design support; and
- preparation of this report.

These CQA activities are described in Sections 4.1.2 through 4.1.5.

4.1.2 Description of Work

Remediation of BBDA 2 included excavation and off-haul of debris fill material, replacement with clean engineered fill, and installation of erosion control features. Further description of the design and construction elements of BBDA 2 is included in the RDIP (Geosyntec, 2013a) and in Sections 1 and 3 of this report.

4.1.3 Construction Quality Assurance

In addition to design support, Geosyntec's primary role during the remediation of BBDA 2 was as the CQA Consultant. The services performed included:

- monitoring excavation and verifying that observed debris fill soil was removed from the excavation;
- collecting soil conformance samples at predetermined sample locations discussed in the RDIP and testing for presence of COCs;
- collecting soil samples for moisture-density relationship testing (ASTM D1557) to evaluate the maximum dry density and optimum moisture content of the import fill;
- monitoring placement, moisture conditioning, lift thickness and consistency of compactive effort of import fill during backfilling;
- testing field density and moisture content of placed import fill to verify compliance with earthwork specifications;

- verifying proper installation of erosion control blankets, fiber rolls, silt fence and wood mulch; and
- documenting construction activities.

4.1.4 Design Support

During the remediation of BBDA 2, Geosyntec provided design support, which included:

- coordinating with contractors and owner;
- collecting and reviewing submittals and requests for variance from the contractor;
- preparing construction memoranda detailing design changes that occurred during construction;
- reviewing survey as-built data; and
- attending weekly construction meetings.

These tasks were ongoing throughout the duration of the construction.

4.1.5 Report Preparation

Included in this report is a discussion of the findings and observations of Geosyntec's on-site CQA personnel and off-site laboratories for the tasks summarized in Section 4.1.3. Documentation of construction activities, including testing associated with the construction, are presented as appendices to this report (Appendices G and H).

As-built drawings showing surveyed elevations for the pre-excavation, post-excavation and final grade elevations were provided by Chaudhary. All record drawings are included in Attachment L.

4.2 Personnel

4.2.1 Project Technical Personnel

The key technical personnel involved in remediation construction of BBDA 2 are listed below:

The Presidio Trust (Owner)

- Eileen Fanelli – Project Manager
- Angela Liang Cutting – Technical Project Manager (Roux Associates)
- Bjorn Wespestad – Construction Manager (Roux Associates)
- Bill Ingles – Construction Manager (CH2M Hill)
- Ben Wright – Construction Manager (CH2M Hill)

National Park Service (Land Management Agency)

- Brian Ullensvang – Remediation Manager

ERRG Construction (General Contractor)

- Tiffany Angus – Project Manager
- Tyson Appel – Project Manager
- Theodore (Ted) Hugel – Project Superintendent

Chaudhary & Associates, Inc. (Surveyor)

- Helmut R. Korstick – Surveyor-of-Record

Geosyntec Consultants, Inc. (Design Engineer and CQA Consultant)

- George Ford, CEG – Project Manager
- Christopher Hunt, Ph.D., P.E., G.E. – Design and CQA Engineer of Record
- Amy C Padovani, P.E. – CQA Manager
- David Umberg – Staff Engineer, CQA Field Support
- William Hagler – CQA Field Technician
- Brian Martinez – Senior Staff Engineer, CQA Field Support

H.T. Harvey & Associates (Biological Monitoring)

- Matt Quinn – Ecologist
- Will Spangler – Ecologist

- Nellie Thorngate – Ornithologist

AMEC Environment & Infrastructure, Inc. (Archeological Monitoring)

- Craig Hauer, MA, RPA – Senior Archaeologist
- Mary Jo Heassler – Associate Geologist

4.2.2 On-Site CQA Monitoring Personnel Schedules

The remediation of BBDA 2 occurred during the period of 15 July through 26 September 2013. Geosyntec provided qualified CQA personnel on-site to monitor construction activities on a part-time basis during waste debris excavation from 15 July through 16 August 2013. Full-time monitoring was established during backfill placement and compaction, from 19 August through 10 September 2013. The punch list walkthrough for the site was performed on 11 September 2013 with personnel from Roux Associates, CH2M Hill, Geosyntec, NPS and DTSC in attendance. Geosyntec' s final walkthrough was performed on 30 September 2013 to confirm that items from the punch list had been addressed as approved by all parties. Monitoring was coordinated, as necessary, with the Trust and with ERRG staff. Geosyntec personnel were on site during construction either part-time or full-time according to the following schedule:

Brian Martinez	10, 13, 15 and 19 July 2013
David Umberg	23 and 26 July 2013 5, 19 - 23, and 26 - 30 August 2013 3 - 6 and 9-10 September 2013
Will Hagler	7 - 9 August 2013
Nate Mullaugh	24 and 29 July 2013
Anthony Smith	6 and 7 August 2013
George Ford	22 July 2013 2 August 2013
Amy Padovani	10, 17, 24 and 31 July 2013 6, 7 and 27 August 2013 6 and 11 September 2013

Christopher Hunt	3 and 30 July 2013 21August 2013 11 September 2013
Adrienne Miller	13 and 30 September 2013

5. DESIGN MODIFICATIONS AND FIELD VARIANCES

5.1 Introduction

At various times during construction, aspects of the original design were re-evaluated due to: (1) discrepancies between actual field conditions and those conditions assumed as part of the design, (2) discrepancies between specified products and commercially available materials; and (3) additional modifications requested by the Trust

The modifications performed as part of this project were grouped in two categories: (1) design modifications and (2) field variances. Design modifications corresponded to changes performed at the request of the Trust, and generally involved revisions to the construction drawings. Field variances generally corresponded to modifications made as a result of changed field conditions (i.e., different than assumed for design) or efficiencies proposed by ERRG in order to meet the project schedule or reduce cost. All proposed design modifications or field variances were reviewed by the Design Engineer and only those that were found to be consistent with the design intent as presented in the FS/RAP (AMEC, 2013) and RDIP (Geosyntec, 2013a) were allowed.

5.2 Design Modifications

5.2.1 Dust Monitoring Perimeter Walk-thru

Section 4.3.2 of the Air and Dust Monitoring Plan (ADMP) states that: "Instantaneous monitoring will be conducted periodically during the workday and will consist of walking the fenced perimeter of the site, at a slow pace, while observing the monitor". At the request of the Trust, and as described in Section 3.1 of this report, Geosyntec re-evaluated the need for this hourly perimeter monitoring during earthwork operations for BBDA 2.

Geosyntec prepared a letter to the Trust requesting an amendment to the ADMP removing this requirement, which was then provided to DTSC for their review and concurrence on 16 July 2013. Copies of Geosyntec's letter to the Trust, as well as DTSC's concurrence regarding the proposed modification are included in Appendix D-1.

5.2.2 Erosion Control Blanket Type

During submittal review, it was observed that one of the specified ECB products to be used in areas requiring Type 3B ECBs, did not meet the specification requirement (Section 29.07 of the Technical Specifications) that all erosion control blankets to be

used at the project site be made out of 100% coconut fiber. Geosyntec evaluated the proposed alternate product provided by ERRG, and concluded that the material met the requirements of the specifications and therefore it would be acceptable for use at the site. The approved alternate material was the same Type 4 erosion control blanket already approved for all other areas at the site.

5.2.3 Final Grading Plan Modifications – Revision 1

Revision 1 to the Final Grading Plan (Drawing 6) was prepared because additional excavation of debris fill from BBDA 2 resulted in an extension to the boundaries of the excavation footprint outside of the original design limits (see Construction Memorandum #2 included in Appendix C). In addition, the Trust requested that the revised grading plan attempt to reduce backfill quantities, as the Trust was concerned that the available serpentine backfill soils available for the project would not be sufficient due to the over-excavation to remove observed debris in some areas. Reduced backfill quantities were obtained, in part by steepening the fill slopes from the original 3H:1V (horizontal:vertical) to 2H:1V. Revision 1 also included recommended modifications to the erosion control plan.

5.2.4 Final Grading Plan Modifications – Revision 2

Estimates of the amount of serpentine soils available at the Dust Bowl and the amount of import fill required by Revision 1 to the final grading plan indicated that additional soils might be needed in order to meet the volume needs of the new grading plan. In an effort to reduce the potential shortfall, the Trust identified an additional source of native serpentine backfill stockpiled at the Nike site.

The availability of additional serpentine soil removed the concern of a potential shortfall of import fill, and additionally allowed for the final grades to be revised to flatten portions of the 2H:1V slopes developed as part of Revision 1. Flatter slopes result in improved stability and increased erosion resistance. Revision 2 of the Final Grading Plan (Drawing 6, Revision 2) incorporates modified contours along the northwestern and eastern portion of the site, away from the historical magazine structures where NPS requested that no additional fill be placed over the Revision 1 grades.

Construction Memorandum #3 (included in Appendix C) documents Revision 2. In addition to the revised final grading plan, Revision 2 includes a revised Final Erosion and Sediment Control Plan (Drawing 10, Appendix K) consistent with the final grades.

5.3 Field Variances

5.3.1 Import Backfill In-place Moisture Content Range

During fill placement operations the nuclear density gauge indicated that the moisture content of the serpentine soils that came from the Dust Bowl stockpile was higher than allowed by the technical specifications for the project (Section 22.02.02). Specifications for the project required a moisture content range between +2 to +4% above optimum, or 12 to 16% based on the moisture/density relationship curve for this material. Moisture tests performed on material from the stockpiles showed an average moisture content for the soils of 20%. Based on field conditions, Geosyntec re-evaluated the specified moisture content range and concluded that a moisture range of +1 to +5% above optimum would also meet the design intent given the material been used. The new moisture content range allowed ERRG to reduce the amount of work needed in order to dry the material from the stockpiles.

6. EARTHWORK QUALITY ASSURANCE

6.1 Introduction

Construction quality assurance for earthwork activities included:

- Observing that excavations and backfill were performed in general accordance with the Construction Drawings in the RDIP (Geosyntec, 2013a);
- Monitoring and verifying that, to the extent practicable, all debris containing COCs was excavated and disposed off-site;
- Monitoring that excavation activities were performed in accordance with cultural resource requirements provided in the RDIP (Geosyntec, 2013a). Cultural resource monitoring at the Site was performed by AMEC. Their onsite activities are described in their report included in Appendix F;
- Monitoring that excavation activities were performed in accordance with natural resource requirements provided in the RDIP (Geosyntec, 2013a);
- Monitoring that excavation equipment was not operated within the equipment restriction zone identified on the Construction Drawings (Geosyntec, 2013a). As the general contractor on-site, ERRG was responsible for ensuring that their equipment did not encroach into the equipment restriction zone identified on the drawings;
- Off-site laboratory testing of the import fill, including modified Proctor compaction tests (ASTM D1557) for density evaluation; and
- In-situ moisture/density testing (ASTM D6938) of each soil type, to verify that compaction requirements were met.

The import fill soils used for this project consisted of serpentine soils which were compacted, and graded to meet the design final grades. Soils used as import fill were approved for use at the Presidio and were imported from other sites within the Presidio. A detailed description of the different import fill soils that were used at the site is included in Section 2.7 of this report.

6.2 Serpentine Soil

Two different soils were used as import fill: (1) Serpentine soil from the Nike Site (i.e., Nike soils), and (2) Serpentine soil from the Dust Bowl (i.e. Dust Bowl soils). Approximately 3,270 yd^3 of serpentine soil were used between un-amended import fill (described here) and the amended import fill (see Section 3.7). Out of this quantity,

approximately 570 yd^3 (loose) were obtained from the Nike stockpile and 2,700 yd^3(loose) from the Dust Bowl stockpile.

Serpentine soils from the Nike source had to be screened to remove oversize particles. The material had a significant fraction, approximately 5% to 10% of the total volume, of 1 to 1.5 ft sized boulders.

Geosyntec obtained one sample of the Dust Bowl serpentine soils to test for Moisture/Density relationship (ASTM D1557). The test results were used to confirm that the relative density and moisture content of the in-place soils met the requirements of Section 23.02.03 of the Technical Provisions. Laboratory test results are presented in Appendix E-1.

In addition, three bag samples were also collected from the Dust Bowl serpentine soils, to evaluate the in-place moisture content of the soils using laboratory methods, per ASTM D2216 (see Appendix E-1 for laboratory test results). The laboratory results were then used to estimate a moisture content correction that was needed for proper interpretation of the nuclear density gauge measurements, given that serpentine soils contain high amounts of hydrogen which affected the moisture content results measured with the nuclear gauge. The correction was applied to all serpentine soil moisture content readings performed for the project.

During construction, in-situ moisture/density was measured using the nuclear method (ASTM D6938). In total:

- Nine (9) tests were performed on the Nike soils placed in the key trench at the base of the slope to verify that a relative compaction of 90% was achieved, as specified in Section 23.02.03 of the Technical Provisions. Note that these tests were performed as a check only relative to the Dust Bowl serpentine soil compaction curve, as no compaction curve was obtained for the Nike soils and the requirement was for 6 inch lifts and a firm and non-yielding material.
- Twenty eight (28) tests were performed on the Dust Bowl soils placed within the fill areas shown on Construction Drawing #6, Revision 2, to verify that a relative compaction of 90% was achieved, as specified in Section 23.02.03 of the Technical Provisions.
- Seven (7) tests were performed on the final lift of un-amended Dust Bowl soils (i.e., depth of approximately 12 to 18 inches below the final grades shown on Construction Drawing #6, Revision 2) to verify that a relative compaction between 85 and 90% was achieved, as specified for the upper 18-inches of

material on Section 23.02.03 of the Technical Provisions. Note that of the upper 18 inches, only the top 12 inches were amended.

6.3 Amended Serpentine Soil

Only the Dust Bowl soil was used for amended soil. Approximately 2,700 cubic yards of Dust Bowl soils were used between un-amended (see Section 6.2) and amended soils (described here). Approximately 775 cubic yards (compacted in-place volume) or approximately 1,100 cubic yards (loose volume) of Dust Bowl soils were used as import fill within the uppermost 12-inches of the final grading plan shown on Drawing 6, Revision 2 (Appendix K). The uppermost 12 inches were amended to allow for future plant growth. Geosyntec verified that a relative compaction between 85 and 90% was achieved for amended soils.

Although both the amended and un-amended soils were obtained from the same serpentine stockpile, one of the products used for the amended soils was gypsum. Like serpentine, gypsum is another hydrogen rich material. Therefore, a bag sample was collected from the amended soils stockpile in order to evaluate laboratory moisture content per ASTM D2216. The moisture obtained from the laboratory test was used to estimate the moisture correction to be used while testing amended soils using the nuclear gauge. Laboratory test results are presented in Appendix E-1.

During construction, the in-situ moisture/density was measured using the nuclear method (ASTM D2922). In total:

- Twelve (12) tests were performed on the amended Dust Bowl soils placed within the upper 12-inches of final grades, as shown on Construction Drawing #6, Revision 2, to verify that a relative compaction between 85 and 90% was achieved, as specified for the upper 18-inches of material on Section 23.02.03 of the Technical Provisions.

7. DEBRIS FILL MATERIAL CHARACTERIZATION AND DISPOSAL

Debris fill excavated from BBDA 2 was stockpiled to the south of Building 1648, to the east of Battery Godfrey while awaiting off-haul. The material was placed on top of plastic tarps and kept moist at all times to avoid potential dust generation. Continuous dust-suppression was used during haul truck loading for off-site disposal.

Prior to the commencement of excavation activities at the Site, ERRG collected composite samples of the in-place debris fill in order to characterize the material for landfill disposal purposes. The excavation area was divided into 7 zones (BBDA2-WC01 thru BBDA2-WC07), each corresponding to approximately 1,000 cubic yards of debris per landfill requirements. Four samples were collected and composited from each zone and were then analyzed by BC Laboratories, Inc. of Bakersfield, California. All composite samples were analyzed for California Title 22 metals, which had been previously identified as the only analytes driving waste characterization (Mactec, 2011). Results from the laboratory indicated that all samples were classified as non-hazardous waste, and could therefore be disposed of at a Class II non-hazardous landfill.

The original excavation limit along the northwest corner of the site was extended to the north due to the presence of visible debris along the original excavation boundary. As such, additional waste profiling was necessary. ERRG collected four samples from the additional excavation area and composited them as sample BBDA2-WC08. The sample was analyzed for California Title 22 metals at C&T's facility in Berkeley, California. Test results indicated that the material was not considered hazardous, and could therefore be disposed of at a Class II non-hazardous landfill.

One additional composite sample (BBDA2-WCBS) was collected by ERRG from within the central portion of the Site where a distinct black soil was encountered at the bottom of the excavation. This sample was tested for California Tittle 22 metals, benzene, toluene, ethylbenzene and xylenes (BTEX) and for total extractable hydrocarbons (TPH-d). Results from all tests indicated that the sample was classified as non-hazardous, and could therefore be disposed of at a Class II non-hazardous landfill.

Debris fill profiling documentation, including a map showing the approximate location of samples collected at the Site and all laboratory test results, is included in Appendix J-1.

A total of 14,273 tons of BBDA 2 material was profiled as Class II non-hazardous waste soil. The landfill material was transported between 17 July and 9 August 2013 to Potrero Hills Landfill in Suisun City, California, a Presidio Trust approved landfill. Disposal documentation is included in Appendix J-2.

8. AIR MONITORING

As described in the Air and Dust Monitoring Plan (ADMP, Appendix G of Geosyntec, 2011a), risk-based concentrations in air (RBC_{air}) were developed based on BBDA 2 chemicals of concern (COCs). Additionally, a particulate action level for particles 10 microns or smaller in diameter (PM_{10}) of 70 $\mu g/m^3$ was established based on an 8-hour workday time weighted average. As presented in the ADMP, because the dust action levels for protection of exposure to COCs are higher than the PM_{10} action levels, the 70 $\mu g/m^3$ PM_{10} action level was selected as the basis for air monitoring and dust control at the site during excavation activities.

During backfill operations, as approved by the Trust, a 5 milligrams per cubic meter permissible exposure limit (PEL) for respirable dust was used to evaluate the data, in lieu of the 70 $\mu g/m^3$, because the impacted soil and debris had been removed from the site. This value corresponds to California Division of Occupational Health and Safety's (Cal/OSHA) PEL for respirable dust.

8.1 Monitoring Locations

Stationary air monitoring was conducted along the site's perimeter at three locations:

- One monitor (U) was located along the upwind side (i.e., southwest corner of the site)
- Two monitors (D1 and D2) were located on the downwind side of the site in the vicinity of Magazine 27 (D1) and near the construction entrance gate adjacent to Lincoln Boulevard (D2).

All locations are shown on Figure 1 in Appendix M-1.

8.2 Air Sampling Activities

To confirm that COC concentrations did not exceed their RBC_{air} values during earthmoving activities, perimeter dust and air samples were collected for offsite laboratory analysis at each monitoring location during the work hours in which soil removal activities were performed. One perimeter dust and air sample was collected on a weekly basis for two weeks at each of the upwind and downwind monitoring locations.

Background air and dust monitoring was conducted by ERRG on 13 July 2013, and construction-phase air and dust monitoring was conducted from 15 July through 30 July 2013. Samples were collected weekly prior to and during earthmoving activities using a PDR 1200 dust monitor powered by either an AirOne Model TI-004 or a Buck Libra

Model L-4 pump. One field blank was collected per analytical method. Once collected and labeled, the samples were transported with completed chain of custody forms to McCampbell Analytical, Inc. (McCampbell) in Pittsburg, California for analysis by EPA Method 6010B (metals), NMAM Method 5600 (pesticides), and NMAM Method 5506 (PAHs).

Analytical results for samples collected from air and dust monitoring indicate that concentrations of all COCs were not detected above their respective RBC_{air} values. The Trust requested to discontinue air and dust monitoring for COCs at the Site on 31 July 2013 (Attachment M-1). This request was approved by DTSC on 31 July 2013 (Attachment M-2).

8.3 Routine Air Monitoring Activities

Routine air monitoring, including baseline and perimeter air monitoring and collection of meteorological measurements, were performed under the oversight of the general contractor, ERRG. Details of ERRG's air monitoring program, which included background monitoring on 13 July 2013, and ongoing perimeter air monitoring from 15 July 2013 to 10 September 2013 are presented in their Summary of Air Monitoring Activities report included in Appendix M-3.

9. SUMMARY AND CONCLUSIONS

Remedial construction work at BBDA 2 was conducted in general accordance with the RDIP (Geosyntec, 2013a). Design modifications described in this report were consistent with the intent of the remedy. As part of the remedy, all visible debris fill and soil exceeding relevant cleanup levels for the project were removed, clean import fill was used to construct stable slopes within the excavation boundary, and the site was protected with robust erosion control BMPs which will be maintained until future vegetation is established along the slopes.

Periodic inspections for erosion control will be performed by the Trust. Geosyntec concludes that BBDA 2 has been remediated in accordance with the requirements of the RDIP and therefore, conditions at the Site are protective of human health and the environment.

10. CERTIFICATION

Based on the observations of Geosyntec Consultants, Inc. during construction, as well as on the test results presented in the attachments of this report, the remedial construction of Baker Beach Disturbed Area 2, at the Presidio of San Francisco, California, was completed in accordance with the intent of the technical specifications and construction drawings, with revisions as stated in this report.

Christopher E. Hunt, Ph.D., P.E., G.E.
CQA Manager and Engineer-of-Record

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12. LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice which existed in Northern California at the time this report was submitted to The Presidio Trust. Geosyntec has prepared this report for The Presidio Trust's exclusive use. No other representations, expressed or implied, and no warranty or guarantee is included or intended. No other party is authorized to use this report, unless granted permission in writing by Geosyntec.

TABLES

Table 3-1
Confirmation Soil Sampling Results
Remedial Construction, Baker Beach Disturbed Area 2
Presidio of San Francisco, California

Sample ID	Sample Interval (feet bgs)	Date Sampled	Metals by EPA 6020 [mg/Kg]: Copper	Lead	Silver	Zinc	Polynuclear Aromatic Hydrocarbons (PAHs) by GC/MS in EPA 8270C-SIM [ug/Kg]: Benzo(a)pyrene	Organochlorine Pesticides by EPA 8081A [ug/Kg]: 4,4'-DDT	Total Chlordane (alpha, gamma)[2]
Soil Cleanup Levels [1]			*85*	*160*	*2*	*160*	*110*	*8*	*9*
BB2EX201[0.0]	0.0 - 0.5	7/24/2013	**230**	140	1.0	**370**	ND < 6.3	ND < 4.2	ND < 2.1
BB2EX301[0.0]	0.0 - 0.5	8/6/2013	21	10	ND < 0.29	63	ND < 5.7	ND < 3.8	ND < 2.0
BB2EX202[0.0]	0.0 - 0.5	7/24/2013	12	7.7	ND < 0.27	37	ND < 5.5	ND < 3.6	ND <1.8
DUP072413 (Dup of 202)	0.0 - 0.5	7/24/2013	13	8.8	ND < 0.26	40	ND < 5.4	ND < 3.7	ND < 1.9
BB2EX203[0.0]	0.0 - 0.5	7/24/2013	21	9.6	ND < 0.33	54	ND < 6.7	ND < 4.4	ND < 2.2
BB2EX204[0.0]	0.0 - 0.5	7/24/2013	23	11	ND < 0.32	69	ND < 6.4	ND < 4.2	ND < 2.1
BB2EX205[0.0]	0.0 - 0.5	7/24/2009	35	46	ND < 0.30	150	ND < 5.1	ND < 3.9	ND < 2.0
BB2EX206[0.0]	0.0 - 0.5	7/24/2013	17	8.7	ND < 0.28	50	ND < 5.7	ND < 3.8	ND < 1.9
BB2EX207[0.0]	0.0 - 0.5	7/29/2013	30	15	ND < 0.28	57	ND < 5.9	ND < 3.9	ND < 2.0
DUP072913 (Dup of 207)	0.0 - 0.5	7/29/2013	26	9.9	ND < 0.29	45	ND < 6.0	ND < 3.8	ND < 2.0
BB2EX208[0.0]	0.0 - 0.5	7/29/2013	4.2	13	ND < 0.29	70	ND < 5.9	ND < 3.9	ND < 2.0
BB2EX209[0.0]	0.0 - 0.5	8/6/2013	72	36	ND < 0.28	70	ND < 5.7	ND < 3.8	ND < 2.0
DUP080613 (Dup of 209)	0.0 - 0.5	8/6/2013	53	63	ND < 0.29	**170**	ND < 5.9	ND < 4.0	ND < 2.0
BB2EX210[0.0]	0.0 - 0.5	8/6/2013	8.4	4.1	ND < 0.27	29	ND < 5.4	ND < 3.5	ND < 1.8
BB2EX211[0.0]	0.0 - 0.5	7/29/2013	48	45	ND < 0.27	140	57	**ND < 18**	**ND < 9.4**
BB2EX212[0.0]	0.0 - 0.5	8/6/2013	30	7.9	ND < 0.28	48	ND < 6.2	ND < 4.1	ND < 2.1
BB2EX213[0.0]	0.0 - 0.5	7/29/2013	33	23	ND < 0.25	42	29	3.6 C #	ND < 1.8
BB2EX214[0.0]	0.0 - 0.5	7/24/2013	16	9.5	ND < 0.28	54	ND < 5.7	ND < 3.8	ND < 2.0
BB2EX215[0.0]	0.0 - 0.5	8/6/2013	16	5.4	ND < 0.26	36	ND < 5.7	ND < 3.8	ND < 2.0
BB2EX216[0.0]	0.0 - 0.5	8/6/2013	13	6.2	ND < 0.27	36	ND < 5.8	ND < 3.9	ND < 2.0
BB2EX217[0.0]	0.0 - 0.5	8/6/2013	19	5.9	ND < 0.27	36	ND < 5.4	ND < 3.6	ND < 1.9
BB2EX218[0.0]	0.0 - 0.5	7/29/2013	56	32	0.49	82	58	**ND < 35**	**ND < 18**
BB2EX219[0.0]	0.0 - 0.5	8/7/2013	15	5.4	ND < 0.31	34	ND < 6.3	ND < 4.2	ND < 2.1
DUP080713 (Dup of 219)	0.0 - 0.5	8/7/2013	21	6.8	ND < 0.34	48	ND < 6.7	ND < 4.5	ND < 2.3
BB2EX220[0.0]	0.0 - 0.5	7/29/2013	**120**	41	ND < 0.26	36	ND < 5.4	ND < 3.6	ND <1.8
BB2EX221[0.0]	0.0 - 0.5	8/7/2013	**90**	72	ND < 0.28	**270**	ND < 5.6	ND < 3.7	ND < 1.9
BB2EX222[0.0]	0.0 - 0.5	7/29/2013	**130**	16	ND < 0.27	30	ND < 5.4	ND < 3.5	ND < 1.8
BB2EX223[0.0]	0.0 - 0.5	8/6/2013	32	79	ND < 0.30	**180**	ND < 6.0	ND < 3.9	ND < 2.0
BB2EX224[0.0]	0.0 - 0.5	8/6/2013	14	8.0	ND < 0.30	46	ND < 6.0	ND < 4.0	ND < 2.0
95% UCL[3]	--	--	58	51	0.36	146	21	7.6	3.9

Notes:

[1] Soil Cleanup levels are taken from the Final RDIP for BBDA 2 (Geosyntec, 2013) , Table 2 "Soil Cleanup Levels for Chemicals of Concern- Baker Beach Disturbed Area 2".

[2] Laboratory results for Chlordane were reported for alpha- and gamma-Chlordane. Reporting limits for both analytes were the same, and equal to the values shown in the table.

[3] 95% UCL = 95% Upper Confidence Limit, computed with ProUCL v4.1

mg/Kg = milligrams per kilogram

ND < RL = Not detected above the reporting limit

C = Presence confirmed, but relative percent difference columns exceeds 40%

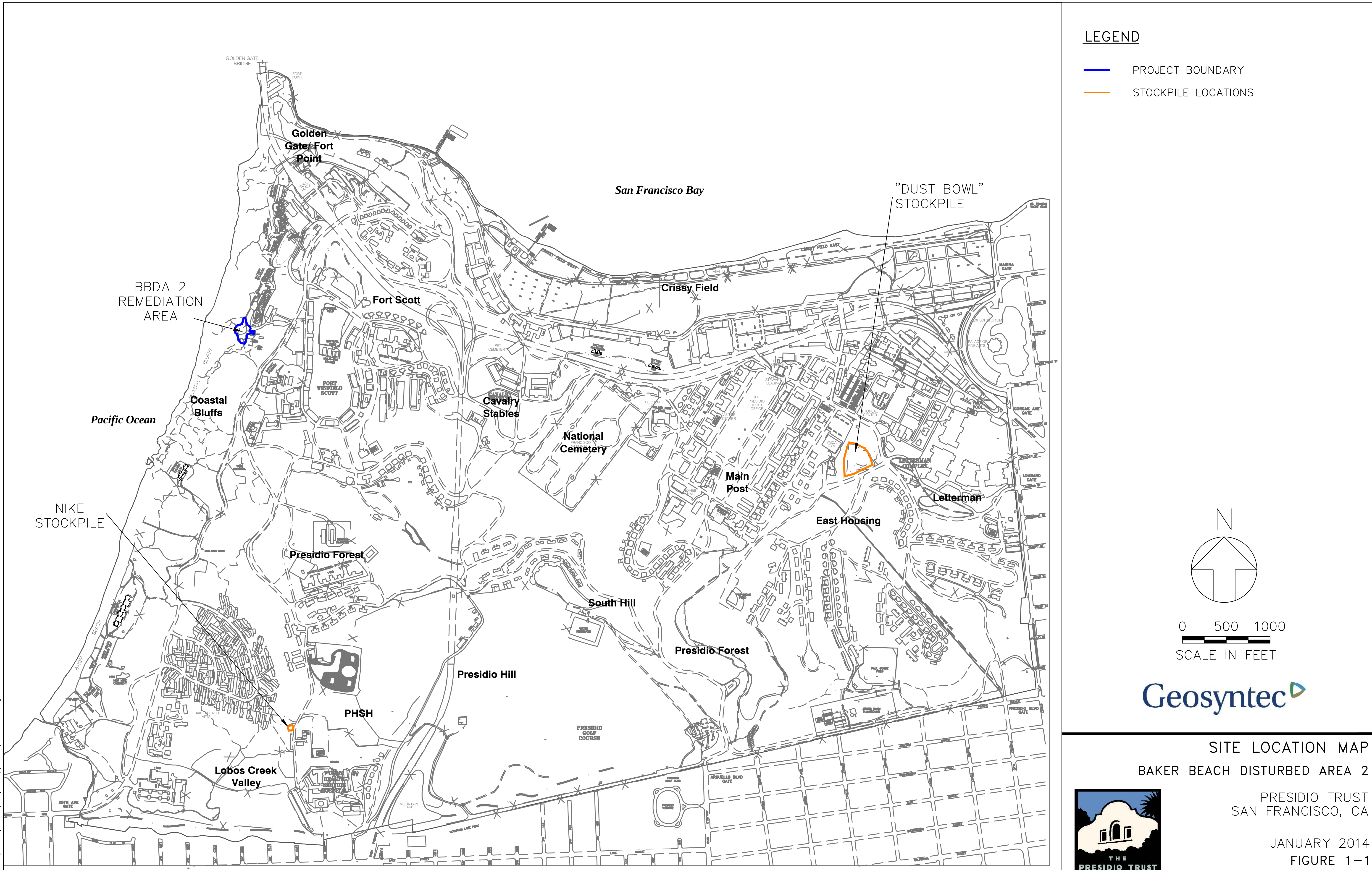
= CCV drift outside limits; average CCV drift within limits per method requirements

270	Indicate exceedances of BBDA 2 Cleanup Levels
ND < 35	Indicates reporting limit above screening level

Table 4-1
Soil Testing Summary
Baker Beach Disturbed Area 2
Presidio of San Francisco, California

Sample Identification	Source	Intended Use	Date Sampled (day/mo/year)	Laboratory Test	Test Method	QA ID
SS-1	Stockpile of serpentinite soil at dust bowl	Backfill at BBDA2	19-Jul-13	Maximum dry density and moisture content	ASTM D1557	ACP
BB2-1	Unamended dust bowl serpentinite	Backfill - deeper than 1 ft bgs	26-Aug-13	In-place moisture content	ASTM D2216	ACP
BB2-2	Unamended dust bowl serpentinite	Backfill - deeper than 1 ft bgs	26-Aug-13	In-place moisture content	ASTM D2216	ACP
BB2-3	Unamended dust bowl serpentinite	Backfill - deeper than 1 ft bgs	26-Aug-13	In-place moisture content	ASTM D2216	ACP
BB2-4	Amended dust bowl serpentinite	Backfill - within 1 ft bgs	26-Aug-13	In-place moisture content	ASTM D2216	ACP

FIGURES



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SITE LOCATION MAP

BAKER BEACH DISTURBED AREA 2

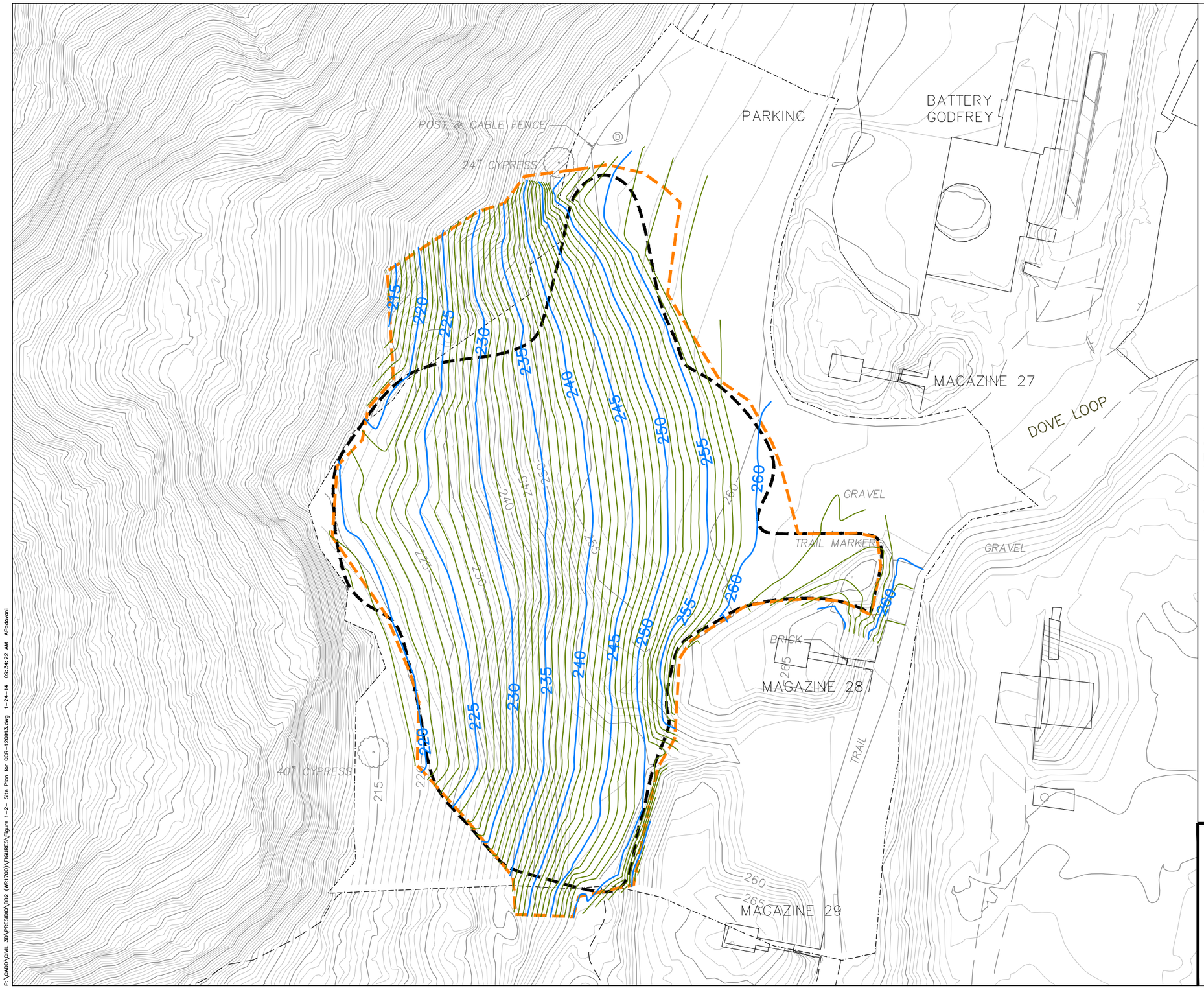
PRESIDIO TRUST
SAN FRANCISCO, CA

THE PRESIDIO TRUST

JANUARY 2014

FIGURE 1–1

P:\CADD\CIVIL 3D\PRESIDIO\BB2 (WR1700)\FIGURES\FIG1-SITE MAP.dwg 1-24-14 01:24:30 PM APadovani



LEGEND

- TOPOGRAPHY (2013 SURVEY AND LIDAR)
- 2013 SURVEY CONTROL BOUNDARY
- DESIGN EXCAVATION LIMIT
- AS–BUILT EXCAVATION LIMIT
- AS–BUILT FINAL GRADING CONTOUR (5–FT)
- AS–BUILT FINAL GRADING CONTOUR (1–FT)

NOTES:

1. EXISTING TOPOGRAPHY BASED ON 2013 LIDAR AND GROUND SURVEY BY TOWILL OF CONCORD, CALIFORNIA. BASIS OF BEARING: CALIFORNIA STATE PLANE 1983. VERTICAL DATUM: NAVD 88.

2. AS–BUILT EXCAVATION LIMITS AND CONTOURS OBTAINED FROM ERRG AS–BUILT DRAWINGS (NOVEMBER 2013).

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0 20 40

SCALE IN FEET

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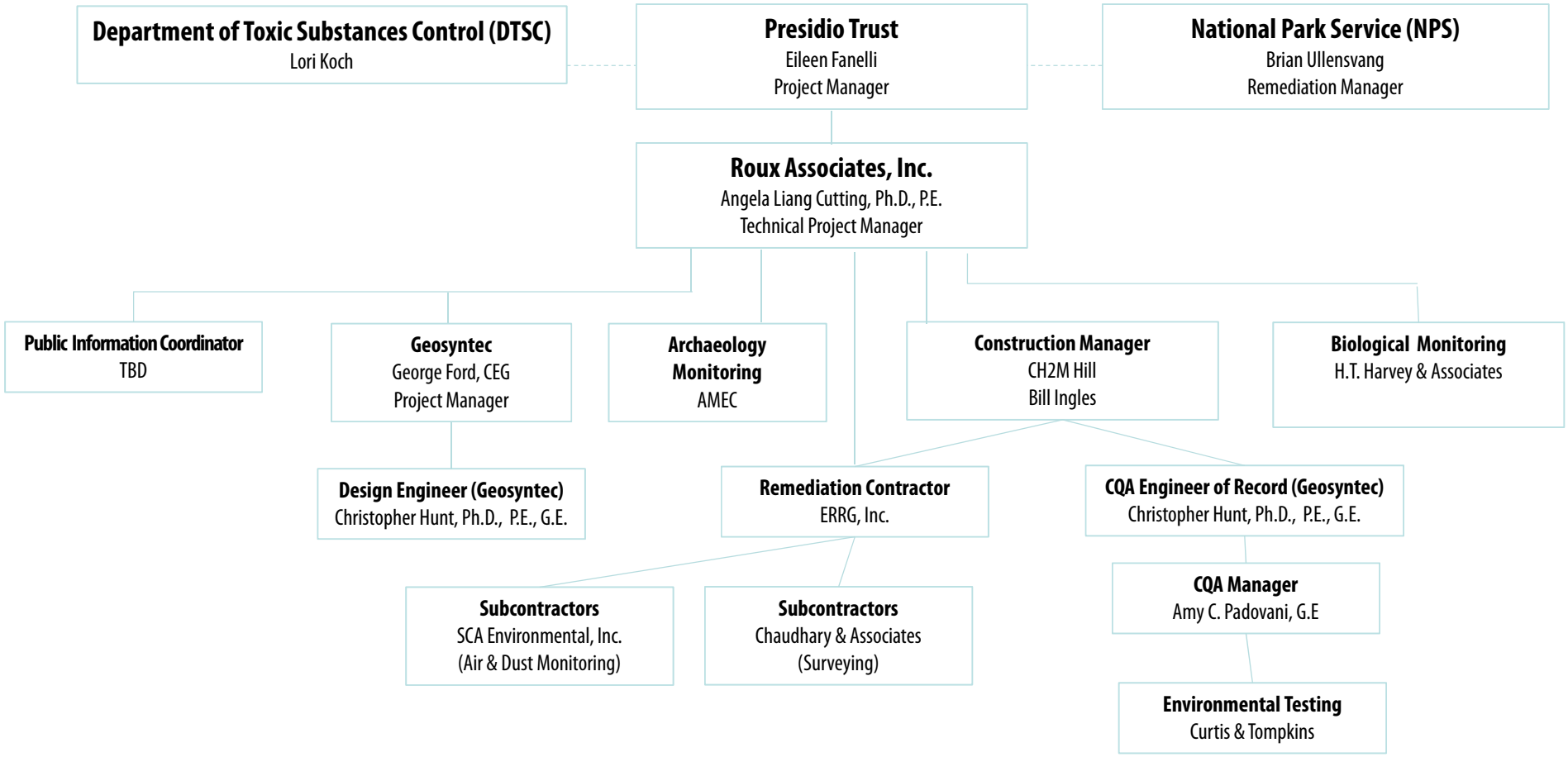
SITE PLAN
BAKER BEACH DISTURBED AREA 2

PRESIDIO TRUST
SAN FRANCISCO, CA

DECEMBER 2013
FIGURE 1–2

Baker Beach Disturbed Area 2
Project Organizational Chart



Project Organizational Chart **Baker Beach Disturbed Area 2** **Presidio Trust** **San Francisco, California**	Geosyntec consultants
	Figure Number: 1-3
	Date: November 2013
	Project Number: WR1700

NORTHERN OVEREXCAVATION AREA (NOTE 5)

SOUTHERN OVEREXCAVATION AREA (NOTE 6)

CONCRETE WASHOUT MATERIAL (NOTE 4)

BB2EX222
BB2EX221
BB2EX220
BB2EX219
BB2EX224
BB2EX218
BB2EX217
BB2EX214
BB2EX215
BB2EX216
BB2EX213
BB2EX212
BB2EX210
BB2EX211
BB2EX209
BB2EX206
BB2EX207
BB2EX208
BB2EX204
BB2EX205
BB2EX202
BB2EX203
BB2EX201
BB2EX301
BB2EX223

POST & CABLE FENCE
24" CYPRESS
40" CYPRESS
GRAVEL
TRAIL MARKER
BRICK
TRAIL
DOVE LOOP
△3
△5

LEGEND

- TOPOGRAPHY (2013 SURVEY AND LIDAR)
- 2013 SURVEY CONTROL BOUNDARY
- DESIGN EXCAVATION LIMIT
- AS-BUILT EXCAVATION LIMIT
- EXCAVATION CONTOUR (2-FT) (NOTE 2)
- APPROX. LIMITS OF CONCRETE (NOTE 4)
- GRID CONFIRMATION SOIL SAMPLE LOCATION (50' X 50' GRID)
- PERIMETER CONFIRMATION SOIL SAMPLE LOCATION (APPROXIMATELY EVERY 50 L.F.) (SEE NOTE 3)

NOTES:

1. EXISTING TOPOGRAPHY BASED ON 2013 LIDAR AND GROUND SURVEY BY TOWILL OF CONCORD, CALIFORNIA. BASIS OF BEARING: CALIFORNIA STATE PLANE 1983. VERTICAL DATUM: NAVD 88.
2. EXCAVATION CONTOURS BASED ON END OF EXCAVATION SURVEY BY CHAUDHARY & ASSOCIATES ON 8 AUGUST 2013.
3. PERIMETER CONFIRMATION SOIL SAMPLES WERE NOT COLLECTED AT WESTERN PERIMETER DUE TO THE PROXIMITY OF BLUFF, OR ALONG MAGAZINES 28 AND 29 DUE TO HISTORICAL EARTHWORKS.
4. A LIMITED AREA OF CONCRETE WASHOUT MATERIAL WAS LEFT WITHIN THE EXCAVATION FOOTPRINT AS OUTLINED.
5. NORTHERN OVEREXCAVATION AREA OUTSIDE OF INITIAL EXCAVATION LIMIT WAS BASED ON VISUAL OBSERVATION OF DEBRIS. EXCAVATION WAS TERMINATED WITH LIMITED REMAINING VISIBLE DEBRIS DUE TO SAFETY CONCERNS.
6. SOUTHERN OVEREXCAVATION AREA OUTSIDE OF INITIAL EXCAVATION LIMIT WAS BASED ON EXCEEDANCE OF ZINC DETECTED AT SAMPLE BB2EX201 LIMIT OF OVEREXCAVATION DEFINED BASED ON SAMPLE BB2EX301 (1 FT BELOW BB2EX201) AND SAMPLE BB2EX223 (~10 FT SOUTH OF BB2EX201).
7. LOCATIONS OF BB2EX209, BB2EX212 AND BB2EX223 ARE APPROXIMATE. SAMPLES BB2EX209 AND BB2EX212 WERE COLLECTED OFF OF THEIR INITIAL LOCATIONS AT THE NEAREST EDGE OF THE CONCRETE ZONE. SAMPLE BB2EX223 WAS COLLECTED APPROXIMATELY 10 FT SOUTH OF SAMPLE BB2EX201 AT THE EDGE OF EXCAVATION.

0 20 40
SCALE IN FEET

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CONFIRMATION SOIL SAMPLING LOCATIONS BAKER BEACH DISTURBED AREA 2

PRESIDIO TRUST
SAN FRANCISCO, CA

JANUARY 2014
FIGURE 3-1

THE PRESIDIO TRUST

P:\CADD\CIVIL 3D\PRESIDIO\BB2 (WR1700)\FIGURES\Fig3_5AB_9-EXC.dwg 1-24-14 02:38:47 PM APodovoni